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ANTELOPE HERD RANGES IN CENTRAL MONTANA^{1/}

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Bayless (1969) and Wentland (1968) reported on individual home ranges of marked antelope during winter and summer. This report continues, along slightly different lines, their work on antelope in the Yellow Water Triangle in central Montana. This study relates marked antelope to specific herd units throughout the year. This study will continue. I reached the hypotheses in this report from data gathered mostly between September, 1967 and December, 1968.

The Yellow Water Triangle contains 271 square miles near the geographical center of Montana. It is nearly 23 miles on each side and lies south of a line between Grass Range and Winnett. The Yellow Water Triangle is split into two topographic types: eastern flats and western hills. The eastern flats are a series of low, east-west ridges covered by sagebrush-grass vegetation. The ridges are separated by shallow valleys of greasewood-sagebrush and greasewood vegetation types. Cultivated lands lie along larger streams and hay is the principal crop. The western hills are drainage heads with modified (probably burned) grassland vegetation on ridges and benches, timber on steeper slopes or shale outcrops, and cultivated dryland on benches with better soil. Acreages of sagebrush-grass and greasewood-sagebrush types are minor in the western hills.

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PLEASE RETURN

Prior to this study, our knowledge of antelope using the study areas was not sufficiently detailed to plan sagebrush control experimental treatments on areas which were important to antelope. The conclusions of this study will be used to select, for experimental treatments, areas which are important to antelope during different seasons.

HERD RANGES

Stable social orders are recognized behavior conditions of many animal communities. No other study of marked antelope is known which shows continuing social associations between individual antelope throughout the year. Gregg (1955), Cole (1956), Fichter and Nielson (1962), and Prenzlow *et al.* (1968) studied behavior of individual antelope more than the interactions of herds.

The concept of stable arrangement of social groups in antelope herds, therefore, is new. Etkin (1964), referred to by Knight (1967),

"..... defines a social group as one whose members stay together as a result of their social responses to each other rather than any other factor in the environment. Groups which owe their existence to attractive factors in the environment rather than social responses are called aggregations."

These social responses are based upon recognition of individual antelope in the herd and to some knowledge of their place in the herd structure.

Our thesis of stability of herd associations is based upon reobservations of antelope marked with neck bands and radios over a 3-year period. Three marked antelope for 3 years and many others for 2 years have remained with the same herd, which shows they have strong social bonds. Knight (1967) evaluated sociability of marked elk by "coefficient of association" calcu-

lations (Cole 1949) and concluded for elk,

"With few exceptions no two individuals other than a cow and her current calf were closely associated for more than several days."

Our observations show very few movements of antelope to the outside of the highway boundaries of the Yellow Water Triangle. Summer herd ranges lap outside of the Triangle at three points, but winter ranges are all within the Triangle.

There are at least three types of social interaction in antelope herds. First, the doe and her offspring form a unit of special communal behavior; second, most summer herds are larger associations of doe-fawn groups; and third, winter herds are groups of summer herds.

Does are the stable element of antelope herds and maintain the traditions which perpetuate summer herds, and possibly winter herds also. Often does lead the herd. Their leadership might be due to their better knowledge of the herd range and the traditions they have learned.

Bucks confine their activity to the vicinity of does as much as possible. Bachelor buck herds have a special type of sociability. Bachelor buck herds have coefficients of association during early summer, but they are short-lived.

Winter Herds

I define "winter herd" as: a group or groups of antelope on a common winter range where they often assemble into one herd. Winter herds are mixed sex and age classes; and it is my opinion, they are distinct populations in

central Montana. The "herd range" I define as the entire area used by all of the antelope in a winter herd.

Few antelope with neck bands moved from one herd range to another. Antelope which left one herd range either temporarily or permanently did so as displacement or investigation, partly during the "spring shuffle."

"Spring shuffle" has not been used for antelope before; therefore, it is defined for this paper as: the investigational movements of groups of young antelope, called "shuffle herds," which occur when summer herds break away from winter herds and return to summer ranges. Antelope not attached to a stable social unit are involved in these shuffle movements. Does eventually join other doe-fawn summer herds and bucks from bachelor buck herds. But, sometimes these shuffle herds leave the herd range and take up residence in another herd range.

In an unusual situation, one adult doe wintered in one herd range and summered 7 miles away in an adjacent herd range. One yearling doe moved permanently from one herd range to another. One adult doe changed temporarily to another herd range. One radio-marked yearling doe displaced after trapping to another herd range for winter but returned to former summer range the following spring.

Bucks, more often than does, switched herd ranges. Young bucks we would expect to move around more than older ones and this usually happens as bachelor buck herds break up at the onset of the rut. Four marked bucks, which permanently left herd ranges where they were born, did so as yearlings. One buck displaced to a third herd range as a 2-year-old. Two

bucks set up in successive summers "non-breeding territories" in adjacent herd ranges. A "non-breeding territory" is defined as an area defended by a buck antelope, usually 2 or 3 years old, but where no doe-fawn summer herds are present, seemingly because food conditions of that habitat niche are too poor. These non-breeding territories, like bachelor buck herds, last only until the rut in the fall when the bucks move closer to doe-fawn summer herds. Most banded bucks have been observed through 2 years in the same herd range.

Preferred winter habitat included topography which had south-facing slopes where much warmer microclimates prevailed. On these sites antelope over-used sagebrush and rabbitbrush, sometimes leaving almost untouched adjacent sagebrush stands on flatlands. Six of seven winter ranges are in the eastern flats part of the Yellow Water Triangle, mostly on public land.

We observed that antelope abandoned winter pastures used by cattle and sheep. In many cases, cattle and sheep used sagebrush heavily during very cold weather.

The average size of the seven herd ranges was 24,800 acres and they ranged in size from 10,240 to 59,670 acres. The seven herds averaged 79 antelope in 1968 and 99 antelope in 1969. There was a direct correlation between size of herd range and number of antelope in the winter herd, larger winter herds occupied larger herd ranges. However, high densities of antelope were on smaller herd ranges.

Summer Herds

I define "summer herds" as doe-fawn groups which are more or less

stable throughout the summer. A "summer herd range" is the area used by a doe-fawn group. High association coefficients among members of a doe-fawn group and low association coefficients of animals from different groups indicates they are sociable toward each other in the group and to some degree anti-social to others in adjacent groups. It appears then that they recognize each other as well as the areas each group uses. These summer herd ranges appear to be a form of territory; however we have not studied behavior to see if they are defended or what behavior patterns separate summer herds. When these summer herds mix, they almost invariably separate into the same original herds, thus individual antelope follow the ones which they recognize.

Bucks are accessories to doe-fawn herds. I have observed more than one territorial buck in a summer herd range, as did Cole (1956). Non-breeding territories have been mentioned already. Bachelor buck herds possibly show a sibling association. Without knowing which herds they were born into, we are only surmising an explanation for the differences of their association coefficients. One such herd contained seven marked bucks. High coefficients of association indicated four bucks might have been from the same doe-fawn herd; lower coefficients of association indicated the other three might have been from other adjacent summer herds.

Bachelor buck herds occupied poor habitat as was shown by Wentland (1968). However, they stayed in proximity to doe herds as nearly as territorial bucks would permit. The bachelor bucks were around three of four doe-fawn summer herds in one herd range; the other doe herd was quite isolated.

Summer herds in the Yellow Water Triangle were invariably located where they had access to areas not grazed or lightly grazed by livestock during summer. Cole (1956) noted that antelope used alfalfa fields most where fields enclosed additionally large areas of native rangeland. It is my opinion that the ungrazed native rangeland was the primary attraction and that alfalfa fields were used secondarily when food plants were used up or became dried out on the upland sites. The prevalence of winter pastures for cattle and sheep appears to be an important summer habitat feature for antelope of the Yellow Water Triangle.

Average summer herd ranges covered 4,145 acres or about 6.5 square miles. Key summer areas much like key winter areas were small and the large size of the area was necessary for suitable escape distance.

FUTURE PLANS

In the near future we will investigate more closely: 1) the role of sagebrush in fawning sites; 2) distribution of vegetation types on summer and winter ranges; 3) relationship of livestock to antelope use of rangeland; and 4) movements of antelope on critical areas which are sprayed to kill sagebrush.

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